The Relationship of History to Policy*

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The importance that policy-makers nominally give to history is more than evident in contemporary writing. Addressing the enigma of U.S. energy policy, Brookings Institute President Bruce MacLaury writes:

> . . . extremely complex problems often defy analytical probing, and past experience may represent the best and most reliable source of evidence about current policy alternatives. History may thus compensate partially for the social scientists' well-known shortage of laboratory evidence.[1]

Similarly, in a recent issue of *Science, Technology, & Human Values*, Bruce Mazlish turns to "historical analogies" and "case studies" to help place science indicators in perspective. For Mazlish, history not only provides the laboratory evidence called for by MacLaury but also humanizes cold-hard facts; "case studies give us the immediate human decisions, the nuts and bolts of specific pieces of science and technology, and are invaluable in reminding us of the nitty-gritty reality behind our clean figures and our soaring analogies."[2] Humans always have looked to the past to solve their problems.[3] If present trends are any indication, they always will.

It does not follow from this generalization, however, that historians play key roles in contemporary policy-making circles. In fact, there is not even any general belief today that the historical knowledge we regularly use when reaching decisions ought to be supplied by historians. MacLaury is content to direct a group of economists "with a long-standing interest in the history of economic policy" to collect the data needed for decision-making about future energy policy. Mazlish, who is himself an historian and has championed the application of historical analogy to contemporary problems, lists only "a natural scientist, a political scientist, and an anthropologist" as the team needed to pursue case studies. Our society understands that chemists do chemistry and economists do economics, but does not seem to recognize that history must be done by historians.

Historians' absence from contemporary policy-making circles is to some degree understandable. Most of the historical information needed to make decisions comes from the recent past. This is particularly true for decisions involving science and technology. The origins of the scientific mentality may be centuries old, but the problems that today draw in science and technology more commonly have their immediate origins in post World War II developments and must first be understood within that context and time frame. Most historians have, however, shied away from researching events that are only a few decades old. Historians of science exhibit considerable bias against the study of contemporary science, hoping thereby to avoid "whiggish" pitfalls. This trend is significant enough to prompt Loren Graham to urge his colleagues to put aside their fears of "whiggishness" and learn to dance "contemporary ballet."[4]

Some historians have attempted to argue for the relevance of history to policy-making, but without much success. Marx Wartofsky, for example, feels that "the metasciences" [i.e., the history, philosophy, and sociology of science]

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have not made "anything more than a slight ripple in the pond of ongoing scientific research," and have had little effect on broader policy issues—not "even a ripple in the larger ocean of human concerns of a more immediate and practical sort."[5] In other words, the arguments for relevance, for the utility of history, have been made but not heard. Why has history been unable to gain a position of importance in the nuts-and-bolts world of policy-making? I suggest that historians have perhaps been trying out for the wrong parts.

Traditional Arguments for the Utility of History

The past provides ideal ground for exercising the mind and training it to think about contemporary problems. In addition, this exercise takes place in neutral surroundings, training students to avoid one-sidedness. "Science undergraduates," Graham suggests, "approach contemporary problems such as human genetics with much greater insights if they have already studied previous controversies in the field, such as Darwinism and Social Darwinism."[6] Presumably the same would follow for policy-makers, were they better versed in the history of science. Thomas Kuhn, while admitting that "a clearer grasp of the nature of scientific development is unlikely to resolve particular puzzles of research," suggests that this knowledge "may stimulate reconsideration of such matters as science education, administration, and policy."[7] Beyond this, historical knowledge not only rounds but shapes. In the words of Augustine, history may permit someone to advance from talking about "what has been done" to "what ought to be done or observed, using the boldness of an advisor, not the fidelity of a narrator."[8] This view of the role of history has gained in popularity as so-called external factors occupy increasingly more important roles in histories of science.

Having discovered that science and technology are in many ways tied to social, economic, political, and cultural roots, historians have begun to urge decision-makers to pay more attention to such factors. Graham regards "the fact that in recent debates over the history of science the 'externalists' have won a legitimate place for themselves alongside the 'internalists'," as "filled with meaning for the consideration of current socio-political problems involving science and technology." Wartofsky looks at the same historical studies as providing "a normative critical assessment of the relations between state, class interest, ideology, and the sciences." The implication of both statements is clear. The past provides a controlling perspective from which to view the present. Historians and other "metascientists" are not simply critics, but "normative" critics, who can advise as well as narrate.[9]

I should not overstress the extent to which historians have attempted to occupy advisory roles. Wartofsky cautions that "the metasciences are in no special way fitted to advise or formulate in the domain of applied social questions of science . . . , no more than movie actors or sports heroes are fitted to make pronouncements upon, or to give leadership in, matters of public policy." Historians cannot provide direct advice on policy matters. Rather, Wartofsky removes the metasciences one step from the decision-making process, to a position where they can provide a "second-order critique of the forms and practices of applied rationality."[10] In plainer terms, viewed in this light historians become resident critics; the part being applied for is that of a "normative conscience," "provocateur," or "wise person."

Given such justifications, it is not difficult to understand why policy-makers have not flocked to historians for advice. The justification is itself laudable (and one with which I happen to agree in principle), but it is not easily sold. Most policy-makers do not need (or want) yet another conscience looking over their shoulders while they make decisions.[11] There is no lack of "second-order" critics to point out shortcomings and to suggest new creative approaches to problem solving. Policy-makers faced with specific, tangible problems need workable models and useful facts. The history of science as currently urged upon policy-makers provides neither of these ingredients.

Although historians of science have over the years attempted to reduce historical explanation to simple, uniform parameters, the resulting models have not yet been shown to have much utility. In the 1960s and early 1970s, Kuhn's suggestions about paradigms seemed to have promise for widespread applicability to other disciplines and even to policy-making, but substantive cri-

tiques from both philosophers and historians have left its status as a policy tool very much in doubt. Nor has externalist thinking developed such that its generalizations are widely enough accepted to be used for problem solving. There may be a partial consensus that external factors are "important," but there is no agreement yet on "important for what." The past may provide fertile ground for growing critics, but it is not solid enough ground for erecting policy-making structures. Until this situation changes, the "lessons" of history will be difficult to apply in any constructive way in decision-making.

However, it is in the area of factual information that the history of science may be able to make more substantial contributions to policy-making than it has to date. To illustrate, I will describe a case study that shows how history has been misused, abused, and neglected in the policy field.

For Example—History and the Microwave Debate

One decision that policy-makers regularly face is how to deal with the environmental changes wrought by ongoing scientific/technological innovations and industrial application. Any number of consequences of scientific and technological development can affect the lives of millions of people, either harmfully or beneficially, and so change the course of civilization. This being the case, such developments must be regulated either when they are introduced or when their environmental consequences are discovered to be significant.

Non-ionizing electromagnetic radiation (radiowaves and microwaves, hereafter generally referred to as "RF" radiation) achieved the dubious distinction of "potential environmental hazard" during World War II.[12] New, shorter "microwaves" were developed just prior to the war and were subsequently used during the war in radar technology. Because large doses of RF energy were known to heat human tissue, these and other post-war uses raised questions about the amount of RF radiation humans could tolerate without suffering adverse effects. Some of the biological effects that have been suggested include cataracts, headaches, and disturbances of the heart, as well as more long-term effects such as leukemia or brain tumors. Ever since that time, policy-makers in military and regulatory government agencies and in many private organizations have grappled with the problems posed by increasing levels of RF radiation in the environment, trying to ascertain "how much is too much?" To date, they have yet to formulate a satisfactory solution to this problem. As this article goes to press, there are major industrial projects that are being held in abeyance for want of a definitive RF radiation policy.[13]

The pattern that policy-makers followed over the years is a familiar one. The search for policy commonly begins as a response to a crisis—for example, to the discovery of possible health hazards, to the erosion of public confidence, or to the enactment of controversial legislation. Once activated, the policy-making process usually turns to background, to the process of getting "a thorough picture of what the story is" (to quote the chairman of a 1953 Navy conference on RF bioeffects).[14] If a crisis has arisen, it must have an origin. In 1973, Senate policy-makers held hearings to determine how the legislation that was drawn up in 1968 to solve the microwave problem "has functioned since its passage." Five years later, similar concerns prompted the same response, as the Senate renewed its deliberations on the microwave and other related problems by asking "how the [1968 Radiation Control for Health and Safety] Act has been implemented."[15] Policy-making for the future more often than not begins by looking back in time; *it begins with history.*

The persons called to supply the background information needed for most policy decisions are usually not historians. The reason for this is obvious. Information on events only a few decades ago can be obtained directly from the participants. When key figures are still alive, there is no apparent need to turn to historians. For information on the implementation of legislation, government officials can be called to testify. If the present state of scientific knowledge is crucial for setting policy, practicing scientists can fill in the details on the evolution of the relevant fields. If public concern is thought to have bearing on the decisions, then spokespersons (usually self-proclaimed) for the public can put in appearances.

Unfortunately, reliance on participants rather than trained observers can seriously distort the

information that policy-makers need when making decisions. Some distortions are obvious, even at the time, but most are not. As a result, many policy decisions are based on incomplete or questionable information. Some specific examples may help to describe just how serious the consequences of this situation can be.

Misinformation

The mass media regularly bombard the public with many varieties of uncritiqued information, making much more difficult the task of sorting out fact from fiction in order to make a decision—e.g., should a building variance be granted to allow a major corporation to build an FM radio tower or TV uplink facility in a residential area? The mass media often present information in ways designed to achieve definite, prejudged goals. Today's microwave debate can, for example, be traced directly to a few, uncritical popular sources, such as Paul Brodeur's articles in *The New Yorker* (later published as the book *Zapping of America*), Jack Anderson's reports in the "Washington Merry-go-Round" column, and the courtroom and public statements of a Scarsdale (NY) ophthalmologist, Milton Zaret. While each of these sources used some reliable information, each also disseminated errors, both in judgment and in fact. The public, then, has the arduous task of deciding where truth lies. One group that undertook such a task, a Board of Adjustment in Rockaway Township, NJ, struggled through many months of a fact-finding expedition that, in the end, did not "discover" anything.[16]

Although misinformation may particularly trouble the public, it is by no means found only there. In the 1960s, the State Department as a matter of policy (for reasons of national security) misinformed its employees and representatives of other government agencies about the purpose of medical tests being given to personnel in the American Embassy in Moscow. The tests' actual purpose was to determine whether the microwave radiation that the Russians were beaming at the Embassy presented a health hazard. The announced purpose of the tests was to study the effects of possible "viral contaminants" in the Moscow environment.[17] In this particular case, the misinformation resulted in a lack of information. Policy-makers outside the State Department were not informed about the "Moscow signal" until 1976, 12 years after the "Moscow Viral Study" was begun—a situation that, in turn, delayed serious consideration of subtle biological effects for almost a decade.

A more common form of misinformation results from the willingness of some experts to overstep the bounds of their expertise. For example, in 1968, an industrial spokesman claimed in written testimony at a Senate hearing that microwave hazards posed few problems because "man has a built-in alarm system coupled with his threshold of pain that protects him from thermal injury." Although at the time scientists knew this statement was inaccurate, the lawyer who made the statement did not. Twelve years later, Representative Elizabeth Holtzman (for a while a prime mover for strict RF standards) told her fellow members that "the present voluntary standard really has nothing to do with empirical science," even though empirical evidence has been used to set RF standards since the early 1950s. Some critics may disagree with this evidence and how it has been used, but the standard setting process has not lacked empiricism.[18]

Misinformed statements made in public—such as heresay evidence and off-the-top-of-the-head conclusions—can exert telling influences, in open meetings, during consulting sessions, at hearings, and even in the course of normal conversations. This is particularly true if the speaker is well-respected. It is not at all unusual to have new work dismissed in open meetings on the basis of the word of a single authority who may or may not be completely familiar with the work in question. A simple statement of: "Oh, that experiment, it had very poor controls and the measurement techniques were sloppy," can discredit work before it gets a full hearing.

Missing Information

Over the years, research and policy-making on the effects of microwaves has been hampered by the absence of a number of key pieces of information. Policy-makers know, for example, that in the 1950s the Russians set their RF exposure standard 1000 times below the U.S. standard (at 10 $\mu w/cm^2$ as opposed to the U.S. level of 10 mw/cm^2). To this day, the same policy-makers do not fully understand why the Soviet standard was set so low.[19]

An even more troublesome example can be found much closer to home. Shortly after the American National Standards Institute set its first voluntary RF standard in 1966 (ANSI C95.1-1966), the chairman of the committee that had drawn up the standard resigned his position. Two years later when a new chairman was appointed, he discovered that he could find "little information" about the events leading to the first standard. By turning to colleagues who had actually served on the original committee, he was able to assemble some records, but they were filled with holes. Commenting on records received from his most reliable source, he noted that "apparently this must not be the complete file for the committee activities since there is a jump between 1961 and 1963."[20]

The result of this situation was considerable disagreement on the significance and intent of the first standard, which could possibly have been avoided by turning to an historian. Letters giving insights into the thinking behind the standards do survive; minutes from the early ANSI meetings are squirreled away in long-forgotten file drawers; and personal recollections can be recorded. Although it is not always easy to locate this information, careful studies can supply many of the missing pieces and fill in the foundation for policy-making.[21]

Partial Information

Even when the available information is relatively complete, policy-making rarely proceeds on the basis of the complete record. Fact gathering requires selection and condensation. The testimony that experts supply at hearings and in reports is simply partial information that supposedly (the strength of the supposition depends on the expert's reliability) faithfully represents the fuller record.

Partial information is particularly significant for reporting the results of scientific experiments. Often what has not been discovered or could not have been discovered is as important as what has been discovered. For example, an epidemiological study of persons who worked in the Moscow embassy during the years of microwave bombardment discovered "no convincing evidence ... that would directly implicate the exposure to microwave radiation ... in the causation of any adverse health effects." It is also true—but less often reported—that the same epidemiological study did not and could not have ruled out microwave-related health effects. The survey population was statistically too small and the survey data too close to the period of maximum exposure for subtle changes to be detected.[22] In other words, the study could not have detected either minor-incidence or long-term effects. In cases such as these, the full story must include both the positive and negative findings. Either piece of information alone would distort the picture and establish policy-making on a false foundation.

Value-laden Information

Misinformation, missing information, and partial information represent value-neutral descriptions of the ways in which policy-makers can distort the background. When these distortions arise for particular reasons, they give rise to biased or value-laden information.

There is nothing mysterious about the way in which values enter into the fact-gathering process. Experts making history have opinions on future courses, and they have definite preferences for particular policy options. Accordingly, when called upon to give background information, they may do so in ways that lead to their preferred policy options. They shape the past so that it leads logically to one particular future. In so doing, they necessarily interject values into their descriptions, reports, testimony, and other historical narratives.

A Washington state environmental impact statement (EIS) drawn up in response to citizen concerns about the possible health threats posed by a satellite uplink facility illustrates how easily values can be mixed with facts when policy and history become intertwined. Although industry-written, the EIS was required by law to present an objective overview of, among other factors, possible adverse health effects. The final EIS did not succeed in meeting this requirement. The document presented to policy-makers in March 1982 is filled with value judgments that could render the entire document useless for policy-making; for example, "Neither the experimental research nor the epidemiological studies that have been conducted support a claim of risk [at the levels of exposure eventuated by the proposed facility]."[23]

The equation of risk with scientific experiments clearly requires a judgmental act and there-

fore involves values. Scientific experiments yield factual observations—rats exposed to low doses of microwave radiation do or do not exhibit specific effects. Whether these effects then can or cannot be said to "support a claim of risk" depends on the definitions of "support" and "risk" being used. "Support" and "risk" are not objective endpoints. At best they may be defined legally or by consensus, but even this is seldom the case. The seemingly bland pronouncement that "a look back at what science has accomplished leads to a conclusion that" is, in fact, a value-laden statement masquerading as objective historical narrative. This statement's historical focus can be discerned by comparing it with a statement such as "neither the scholastic lectures of Nicole Oresme nor the metaphysical explorations of Nicholas of Cusa support the claim that the theory of diurnal rotation was taken seriously before the time of Copernicus."

Astute policy-makers may, of course, recognize such value judgments and weigh them when making decisions. They can also be alert to gaps in the record, one-sided reporting, and other distortions in the supposed objective background presented to them. However, to assume that correctives will be introduced undermines the whole purpose of objective fact gathering. The historical background should clarify knotty problems, not confuse or complicate them.

What changes would improve the accuracy and reliability of historical fact gathering for policy-making in general? One immediate suggestion for change would be to involve historians more actively. In the next section, I suggest how this might be accomplished and discuss some of the problems that will undoubtedly be encountered along the way.

Suggestions and Observations

The most direct way to involve history in policy-making is to involve historians—as opposed to scientists, economists, politicians, lawyers, and others. My own experience in the microwave field, working jointly with a physicist and a physiologist, entails just this sort of involvement. Our team has undertaken a detailed analysis of several controversial aspects of the development of the microwave field. Our motivations were initially personal and professional. We had used the microwave debate in a science-values class to introduce students to the intricacies of the modern environmental dilemma; but the more we read about the debate in the secondary literature, the less sense it made, yet the issues raised seemed significant enough to warrant a closer analysis. Fortunately, the NSF Program in Ethics and Values in Science and Technology (EVIST) agreed and the study began—initially as an effort to learn rather than to influence or advise.

Our focus on policy came later, when we discovered that, as outsiders, we could see problems and had background information that the internal experts had missed. It took time to persuade the experts in the field that we might have something of value to contribute. Our first publication in *Science* magazine had several interesting encounters on its way through the review process, and a conference investigating the applicability of cost/benefit analysis to the RF bioeffects field did not immediately enroll a full list of major participants. Eventually the experts and major policy figures did agree to assemble in Ann Arbor, MI, and talk about the future in terms of cost/benefit analysis.[24] Undoubtedly, more discussion and perhaps more dialogue will follow. For example, a comment we recently prepared on the environmental impact statement mentioned above has as its objective to elevate the quality of background discussion.[25] Whether it will have this effect, of course, remains to be seen.

Our research experience suggests that history and historians can be more directly involved in policy-making. For such involvement to be effected on any larger scale, two formidable obstacles—one professional, the other financial—must be overcome, not only in our case but as a general working procedure in policy-making.

The professional obstacles are of two types—internal and external. Internally, the historical profession does not encourage its professionals to participate in policy-making. Were this not the case, Graham's comments on "contemporary ballet" would not have been necessary. Because it is true, it is unlikely that large numbers of historians will move into the policy field, even if it becomes clear that they can contribute something valuable.

The skepticism about whether the historian can say anything of interest to persons grappling with contemporary problems is widespread and

deeply rooted, and it will remain so until historians establish a solid record of contributions to policy development, by demonstrating not only quality but relevance.

The lack of professional encouragement, both internal and external, bears directly on the financial opportunities open for historians working on policy. Programs such as EVIST encourage new approaches and innovation, but EVIST's funds are extremely limited in comparison to the amounts regularly spent in the policy field itself on background studies. If not actually responsible for background studies, historians can at least advise on research formats used to collect background information. More joint history-policy Ph.D. programs can be encouraged, as they are now in a few universities. History Ph.D.s can be directed toward work as research associates on policy-oriented projects.

Policy-making is a mundane, down-to-earth activity. As a consequence, the degree to which history can succeed in aiding policy-making will depend on the degree to which it can function as a fact-gathering skill and not as a provocative intellectual discipline. Although historians may gain new insights from debating the merits of paradigms and internal versus external explanations of historical change, the outcome of these debates has little direct bearing on practical policy decisions. History provides complete, accurate, and unbiased reconstructions of the past, whether that past is centuries old or yesterday. On this basis, applied history can and should be justified. This is the part for which historians of science should try out if they are to perform in "contemporary ballet."

NOTES

1. See Bruce MacLaury, "Foreword" in C. D. Goodwin, ed., *Energy Policy in Perspective: Today's Problems, Yesterday's Solutions* (Washington, DC: The Brookings Institution, 1981), p. vii.
2. Bruce Mazlish, "The Quality of 'The Quality of Science': An Evaluation," 7 *Science, Technology, & Human Values* 38 (Winter 1982): 17–18.
3. For primitive views on the importance of history, see Mircea Eliade, *The Myth of the Eternal Return: Or, Cosmos and History* (translated by W. R. Trask) (New York, NY: Princeton University Press, 1954).
4. Loren Graham, "Why Can't History Dance Contemporary Ballet? or Whig History and the Evils of Contemporary Dance," 6 *Science, Technology, & Human Values* 34 (Spring 1981): 3–6.
5. Marx Wartofsky, "The Critique of Impure Reason II: Sin, Science, and Society," 6 *Science, Technology, & Human Values* 33 (Fall 1980): 13.
6. Graham, *op. cit.*, p. 5.
7. Thomas Kuhn, "The History of Science," *International Encyclopedia of the Social Sciences* 14 (New York: Crowell, Collier and Macmillan, 1968); reprinted in *The Essential Tension: Selected Studies in Scientific Tradition and Change* (Chicago, IL: University of Chicago Press, 1977), p. 121.
8. Augustine, *On Christian Doctrine* II.29.44. Augustine makes this distinction to separate true historians, who do not advise, from "haruspices" or fortune-tellers, who use the entrails of birds to predict the future.
9. Graham, *op. cit.*, p. 5; Wartofsky, *op. cit.*, p. 17.
10. Wartofsky, *op. cit.*, p. 21.
11. There are exceptions to this rule, such as the recent increase in resident humanists (including historians) in medical schools. Historians are also consulted during discussions of general policy, such as planning R&D funding, and so on. The focus of my comments in this article is more directed toward specific decisions in one individual field used as an example.
12. For background information on the microwave debate, see Harold J. Cook, Nicholas H. Steneck, Gordon L. Kane, and Arthur J. Vander, "Early Research on the Biological Effects of Microwave Radiation: 1940–1960," *Annals of Science* 37 (1980): 323–351.
13. RF facilities now regularly being resisted by local communities include: AM and FM radio towers, microwave communication links, satellite uplinks, and radar installations.
14. "Biological Effects of Microwaves," unpublished Navy Department Conference minutes, 29 April 1953 (Washington, DC: Office of Naval Research, 1953), p. 4.

15. *Radiation Control for Health and Safety,* Hearings before the Committee on Commerce, United States Senate, March 1973 (Washington, DC: U.S. Government Printing Office, 1973), p. 1; *Radiation Health and Safety,* Hearings before the Committee on Commerce, Science, and Transportation, United States Senate, June 1977 (Washington, DC: U.S. Government Printing Office, 1977), p. 1.
16. See Rockaway Township Board of Adjustment, "In the Matter of the Application of Home Box Office, Inc.," Hearings beginning 1 May 1980. HBO withdrew its application once it became clear that it would take months to get all of its witnesses on the stand.
17. Information on the early years of the Moscow embassy problem can be found in "Microwave US-USSR, Volume I: 1964–67," documents released to the public by the State Department in response to a freedom of information request.
18. *Radiation Control for Health and Safety Act of 1967,* Hearings before the Committee on Commerce, U.S. Senate, August 1967 (Washington, DC: U.S. Government Printing Office, 1968), pp. 407–408; *Research on Health Effects of Nonionizing Radiation,* Hearings before the Subcommittee on Natural Resources and Environment, U.S. House of Representatives, 12 July 1979 (Washington, DC: U.S. Government Printing Office, 1979), p. 27. The origins of the U.S. RF standard are discussed in Nicholas H. Steneck, *et al.,* "The Origins of U.S. Safety Standards for Microwave Radiation," 208 *Science* (1980): 1230–1237.
19. For one recent attempt to sort out the details of Soviet thinking, see Zorach (Zory) R. Glaser and Christopher H. Dodge, "Some Comments on Occupational Safety and Health Practices in the U.S.S.R. and some Eastern European Countries," in Nicholas H. Steneck, ed., *Cost/Benefit Analysis and the Microwave Debate* (San Francisco, CA: San Francisco Press, forthcoming).
20. Letter from Saul W. Rosenthall to William W. Mumford, 8 August 1969.
21. For an example of the type of study that can be done, see Steneck, *et al.,* "Origins," *op. cit.*
22. Abraham M. Lilienfeld, "Foreign Service Health Status Study," Final Report, The Johns Hopkins University, 31 July 1978.
23. "Draft Environmental Impact Statement, RCA Earth Station, Bainbridge Island, Washington" (March 1982), p. xix.
24. The conference proceedings are published in Steneck, *Cost/Benefit Analysis and the Microwave Debate, op cit.*
25. Nicholas H. Steneck, "Comments, Draft Environmental Impact Statement: 'RCA Earth Station, Bainbridge Island, Washington,' March 1982" (April 1982).

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